



September 2, 2010

Stephen F. Nightingale  
Manager, Permit Section  
Bureau of Land  
Illinois Environmental Protection Agency  
1021 North Grand Ave. East  
P.O. Box 19276  
Springfield, IL 62794-9276



Re: 2018080001 – Winnebago County  
Winnebago Landfill  
Permit No. 1991-138-LF  
Permit Log No. 2010-373

Dear Mr. Nightingale:

On behalf of our client, Winnebago Landfill, submitted herein are an original and three copies of an addendum to Illinois EPA Log No. 2010-373. The application forms were provided in the original application submitted to the Illinois EPA on August 2, 2010.

This addendum is being submitted in response to an Illinois Environmental Protection Agency (EPA) incompleteness letter dated August 31, 2010. In the following narrative, the specific reason for the application to be deemed incomplete is presented in a “**bold font**” followed by the response in “standard font.”

**1. The narrative portion of the application is not included.**

Upon further review, it was determined that the text portion of the application was erroneously removed from the original document. A copy of the text is contained in Appendix A to this addendum. The text should be inserted directly after the table of contents in the original document.

Please contact Tom Hilbert at (815) 963-7516 if you have any questions or require additional information.

Sincerely,

A handwritten signature in cursive script that reads "Teresa N. Sharp".

Teresa N. Sharp  
Environmental Scientist

TNS:bjh:lkj

Enclosure(s)

cc: Tom Hilbert – William Charles Waste Companies  
Bernie Shorle – US EPA Region 5

## **APPENDIX A**

### **Text Portion of Application Log No. 2010-373**

# 1. INTRODUCTION

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Condition No. VIII.15 of Permit No. 1991-138-LF Modification No. 42 requires that an alternate source demonstration be conducted for all confirmed monitored increases detected in facility monitoring wells or that an assessment monitoring program be implemented to determine whether the facility is the source of the increases. Inorganic parameter exceedences that were observed first quarter 2010 were sampled for confirmation during the second quarter 2010 event. During the second quarter 2010 event several organic parameters exhibited observed exceedences. The organic exceedences are related to the Acme Solvent Superfund Site and therefore were not sampled for confirmation. These organic parameters are also addressed as part of this application. This application provides an alternate source demonstration for the first quarter 2010 inorganic confirmed increases and second quarter 2010 observed organic exceedences. The application forms (Certification of Authenticity, LPC-PA1, and copies of the LPC-PA16 forms) are contained in Appendix A.

## 2. BACKGROUND INFORMATION

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### 2.1 Site Description

The facility contains two separate disposal areas (Northern and Southern Units) authorized under a single operating permit (Illinois EPA Permit No. 1991-138-LF). A site map has been provided as Figure 1. The Northern Unit ceased accepting waste on September 8, 2000. The Southern Unit continues to operate in accordance with the current permit. In addition, a North Expansion Unit, located between the existing Northern Unit and Baxter Road, began operation under Illinois Permit No. 2006-221-LF on May 16, 2008. This unit is also shown in Figure 1.

### 2.2 Site History

The North Unit of Winnebago Landfill, previously known as Pagel's Pit, was added to the National Priorities List in June 1986 due to upgradient groundwater contamination (chlorinated solvents) migrating from the Acme Solvents Superfund site and inorganic increases downgradient of the North Unit. Based on perceived groundwater contamination adjacent to the North Unit (at the Acme Solvents site), the U.S. EPA signed a Record of Decision (ROD) in June 1991 requiring Remedial Design and Remedial Action plans. The ROD was incorporated in a Consent Decree entered in the U.S. District Court for the Northern District of Illinois, Western Division, Case No. 92-C-20346 in February 1993. A ROD amendment was later submitted to the U.S. EPA in 1997 for a new or revised Consent Decree to reflect a new Statement of Work (SOW) due to a change in the remedy. The subject amendment to the ROD was issued in 1999.

The facility currently exists with a Groundwater Management Zone (GMZ) and approved remediation program via source control. The GMZ application was submitted July 10, 1995 (Illinois EPA Log No. 1995-250) to facilitate compliance of the Northern Unit with the applicable requirements of 35 Illinois Administrative Code (Ill. Adm. Code) Parts 811 and 812, pursuant to Sections 814.104, 814.301, and 814.302.

### 2.3 Site Hydrogeological Summary

The site hydrogeologic characteristics have been accurately determined based on implementation of a series of subsurface investigations, beginning with the initial drilling investigation in 1969 by

Testing Engineers, Inc. Subsequent investigations have included advancement of borings, well/piezometer installations for the existing site and facility expansion, and comprehensive groundwater quality testing due to releases by Acme Solvents. Additional hydrogeologic information has been gained due to development activities of the North Expansion Unit, which includes excavation of materials exposing bedrock and unconsolidated deposits.

### **2.3.1 Unconsolidated Deposits**

The composition of the unconsolidated deposits, which appear to be glacial outwash, varies with location throughout the facility boundaries. Coarse-grained sand and gravel with occasional silt and/or clay seams typically underlie the Northern Unit. The thickness of the sand and gravel varies from just a few feet beneath the east toe of the waste footprint to approximately 70 feet beneath the western edge of the waste boundary. The sand and gravel thickens to the west, corresponding with the erosion of the underlying dolomite. Unconsolidated sand and gravel glacial drift sediments directly underlay the western portion of the Northern Unit, while fractured dolomite bedrock underlies the eastern portion of the landfill.

### **2.3.2 Bedrock**

The bedrock consists of dolomite, fractured and weathered to varying extents. Chert layers, chert nodules, and small vugs were commonly noted on boring logs. However, larger voids or karst characteristics were not indicated on the boring logs. The bedrock surface is highly variable throughout the facility, with a high of approximately 750 feet above mean sea level (MSL) at the southeast corner of the North Unit to a low of approximately 675 feet above MSL to the west and south of the South Unit. East of the site a dolomite bedrock upland is present and outcrops in the vicinity of the Acme Solvent site. This bedrock upland represents the eastern bedrock escarpment of the Upper Rock buried valley. The site is situated on the eastern edge of the Upper Rock buried bedrock valley. The overburden thickens as the elevation of the bedrock surface decreases to the west. As determined by boring investigations included as part of the GMZ application (HSI GeoTrans, May 1997), the bedrock continues to decrease in elevation west of the site to approximately 645 feet above MSL directly west of Killbuck Creek.

### **2.3.3 Uppermost Aquifer**

The uppermost aquifer for the site is located within the glaciofluvial sand and gravel deposits and the upper portion of the fractured dolomite bedrock. The saturated sands and gravels, which directly overlie the bedrock, occur in the western two-thirds of the Northern Unit. In locations where there are no saturated glaciofluvial deposits, the uppermost aquifer is located within the dolomite bedrock typically overlain by silty clay deposits. This occurs in the eastern third of the Northern Unit.

### **2.3.4 Groundwater Flow Conditions**

The general flow direction within the uppermost aquifer is westward and downward in the bedrock upland east of the site. However, groundwater may flow upward from the bedrock to the unconsolidated sediments in areas where sediments are saturated (HSI GeoTrans, 1995). This is due to the higher permeability of the sand and gravel deposits. Groundwater flow in the unconsolidated sediments is to the west-northwest. Potentiometric surface maps provided in Appendix B indicate groundwater movement is generally west-northwest beneath the Northern Unit. Groundwater elevations obtained from recent monitor wells and piezometers installed west of Killbuck Creek indicate flow is to the north west of Killbuck Creek.

Shallow groundwater may discharge to Killbuck Creek while groundwater in the lower part of the unconsolidated sediments and deeper bedrock flows beneath Killbuck Creek.

Killbuck creek is both a gaining and losing stream dependent upon hydrogeologic and atmospheric conditions. During drier periods where the water table drops below the bottom of the creek bed, surface waters feed the groundwater system. During wetter periods where the water table is high (above the bottom of the creek bed) the groundwater system will recharge the stream and wetlands. This fluctuation allows mixing of surface water (and, therefore, surface water constituents) with groundwater (and any groundwater constituents) often on a seasonal basis. In addition, dependent upon the creek stage, the surface waters of both the creek and the wetland mitigation area may be contiguous.

The aquifer system beneath the facility, which includes both the saturated sand and gravel and the upper weathered/fractured part of the dolomite, extends to an approximate depth of 665 feet MSL. East of the landfill and beneath the eastern quarter of the Northern Unit, the water table occurs within the dolomite bedrock. Beneath the western three-fourths of the site and within the Killbuck Creek Valley, the water table occurs within the sand and gravel deposits. Previous hydrogeologic investigations and evaluations have shown that vertical gradients do exist within the uppermost aquifer but are typically slight at any individual location. Therefore, groundwater elevations from the bedrock wells and wells screened in the unconsolidated materials (sand and gravel) were used to create one potentiometric surface for each quarterly sampling period. As expected, the hydraulic gradients are greater at the east end of the facility where the bedrock is higher and flat near Killbuck Creek.

### **3. GROUNDWATER QUALITY**

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In accordance with 35 Ill. Adm. Code 811.319 and the current permit, the groundwater quality is evaluated on a quarterly basis. Results of the statistical evaluations are reported quarterly in accordance with Condition No. VIII.18. Notification of observed increases/confirmed increases have been submitted in accordance with Condition No. VIII.14 of the permit.

#### **3.1 Existing Monitor Well Network**

The facility has an extensive network of monitoring wells from which groundwater data are obtained. Separate monitor well networks exist for the Northern and Southern Units. The Northern Unit contains 23 groundwater monitoring points, of which five are designated as background groundwater quality wells (upgradient), one is a compliance boundary well at the edge of the zone of attenuation and the remaining wells monitor within the zone of attenuation downgradient and sidegradient of the landfill. Winnebago Landfill samples 10 additional wells on a quarterly basis as part of the GMZ monitoring network. Six temporary monitoring wells were installed and sampled from October to December 2009 to monitor the groundwater quality west of the permitted GMZ area. Each of the wells is identified in Figure 1. The following table provides a list of the monitoring wells for the Northern Unit.

<b>Northern Unit Detection Monitoring Wells (23)</b>	
Upgradient	G09D, G09M, G13S, G13D, G20D
Compliance Boundary	R39S
Zone of Attenuation	G03M, G16M, G17S, G18D, G18S, G33D, G34D, G35D, G36S
	G37S, G38S, G40S, G41D, G41M, G41S, R42S, G51S
<b>Northern Unit GMZ Only Wells (10)</b>	
Compliance Boundary	G52S, G52M
Zone of Attenuation	R03S, G16D, G33S, G34S, G35S, G37D, G130, G50S
<b>Northern Unit Temporary Wells (6)</b>	
Zone of Attenuation	T1U-A, T1L-A, T2U-A, T2L-A, T3U-A, T3L-A

The Southern Unit contains 17 permitted groundwater monitoring points. Six are designated as background groundwater quality wells (upgradient); two (G13S and G13D) are also background wells for the Northern Unit. Although, monitoring wells R05S, G29S, and G29D are permitted as zone of attenuation wells, based on the potentiometric surface maps (Appendix B), these wells are also located upgradient to the waste units. The wells have been used previously in the derivation of the background/applicable groundwater quality standards (AGQS) values for the unit. The following table lists the monitoring wells for the Southern Unit.

<b>Southern Unit Detection Monitoring Wells (17)</b>	
Upgradient	R11S, G11D, G13S, G13D, R22S, G22D
Zone of Attenuation	R05S, G23D, R24D, R25D, R27D, R28D, G29S, G29D, G26S, G26D, G49D

### 3.2 Background Concentrations

The initial background concentrations (AGQSS) for the Northern Unit were determined from data obtained from four wells located east of Lindenwood Road on the Acme Solvent property (B-8, STI-2S, STI-2I, and STI-2D). Background sampling occurred during 1990 through 1992. The AGQSS were proposed in the initial significant modification application and subsequent addendums. Addendum 3 to the initial significant modification, dated February 10, 1993, provided the first full listing of routine AGQS values derived from wells G09M, G09D, G13S, and G13D. Since the time the background concentrations were obtained, remediation at the Acme Solvent facility ceased and a quarry began operation east of Acme Solvents (both facilities are located upgradient to the landfill). The approximate location of Acme Solvents and the quarry are shown in 2. These activities have likely affected the current background conditions. To account for changes in the background groundwater quality since 1993, revised AGQS values for 60 G1 and G2 List parameters were submitted and subsequently approved on March 26, 2004 with the issuance of Modification 24 to the current permit.

The initial AGQSS for the Southern Unit were determined from data obtained from the permitted upgradient/background wells. However, revisions to several background values have included data from wells R05S, G29S, and G29D as part of the statistical derivation. Although permitted as zone of attenuation wells, these wells are actually hydraulically upgradient to the Southern Unit and provide additional information on the background groundwater quality. As mentioned in Section 3.1 above, monitor wells G13S and G13D are contained in the monitor well networks for both the Northern and Southern Units. The groundwater quality for these two wells along with R05S (Southern Unit) and G16S/D (Northern Unit) are not evaluated with respect to the permitted AGQSS but are reviewed based on trend analyses in accordance with Condition VIII.25 of Permit No. 1991-138-LF (Modification No. 42).

### 3.3 Confirmed Increases

The table below lists the parameters and wells that have been confirmed to exceed the criteria listed in Condition VIII.13 during the first quarter 2010 confirmed sampling event (first quarter 2010 inorganic parameters and second quarter 2010 organic parameters) at Winnebago Landfill. One parameter was identified as a confirmed increase from a Southern Unit well. All other confirmed increases occurred in Northern Unit wells. The historical sampling results for each of the exceeding wells/parameters are provided as Table 1 and Table 2 for the Northern and Southern Units, respectively. Each confirmed increase is discussed in detail in the sections below. In addition, graphical trend analyses have also been conducted for each of the confirmed exceedences and are provided in Appendix C.

Unit	Well	Location	Confirmed Increases
South	R22S	Upgradient	dissolved chromium
North	G13D	Upgradient	dissolved sulfate, acetone, chlorobenzene,
North	G13S	Upgradient	benzene, chlorobenzene
North	G09D	Upgradient	1,2-dichlorobenzene, benzene, chlorobenzene
North	G20D	Upgradient	1,1,1-trichloroethane, tetrachloroethene
North	R39S	Downgradient	phenolics
North	G41S	Downgradient	cis-1,2-dichloroethene
North	G51S	Downgradient	1,1-dichloroethane, benzene, chlorobenzene
North	G52S	Downgradient	phenolics

#### 3.3.1 1,1,1-trichloroethane

The second quarter 2010 concentration of 1,1,1-trichloroethane exceeded the preceding fourth quarter 2009 concentration at upgradient well G20D. 1,1,1-trichloroethane has historically been detected at G20D during the 1999, 2000, 2002, 2005, and 2008 second quarter monitoring events. The detected concentrations are well below the AGQS/background value (12 ug/l). 1,1,1-trichloroethane is a chlorinated solvent that is likely associated with the Acme Solvents facility located directly upgradient of Winnebago Landfill. As shown on the area location map (Figure 2) well G20D is located between Acme Solvents and the landfill (approximately 700 feet upgradient of the facility). Given the location of the well, and that concentrations remain below the AGQS value, no further action is necessary for this parameter.

#### 3.3.2 1,1-dichloroethane

The second quarter 2010 concentration of 1,1-dichloroethane exceeded the preceding fourth quarter 2009 concentration at well G51S. However, the second quarter 2010 concentration (1.3 ug/L) was well below the AGQS value (31 ug/L). The parameter 1,1-dichloroethane is a chlorinated solvent that is likely associated with the Acme Solvents facility located directly upgradient of Winnebago Landfill. 1,1-dichloroethane has also been detected historically (including second quarter 2010) at upgradient well G20D, which is located between Acme Solvents and the landfill. The concentration at upgradient well G20D (2.5 ug/l) during the second quarter 2010 exceeded the concentration at G51S. The offsite source is affecting the concentrations in both up- and downgradient wells at the landfill facility. The historical detections of 1,1-dichloroethane at G20D have been addressed as part of pending Application Log No. 2010-152 (alternate source demonstration). Since concentrations remain below the AGQS value, no further action is necessary for this parameter.

### **3.3.3 1,2-dichlorobenzene**

The second quarter 2010 concentration of 1,2-dichlorobenzene exceeded the preceding fourth quarter 2009 concentration at upgradient well G09D. 1,2-dichlorobenzene has been detected historically at G09D during the 2003, 2004, 2005, 2006, and 2009 second quarter events. The detected concentrations are well below the AGQS value (5 ug/L), therefore, no further action is necessary for this parameter.

### **3.3.4 Acetone**

The second quarter 2010 concentration of acetone exceeded the AGQS value (10 ug/l) at upgradient well G13D. Acetone has only exceeded once before—at G13D during second quarter 2009. Due to multiple detections of acetone observed at the facility during second quarter 2009, including the field and equipment blank samples, PDC Laboratories released a statement stating in part that *“any detection, especially at levels less than 20 ug/l should be suspected of originating from field or laboratory contamination,”* and *“our concern was that the detections were the result of laboratory contamination.”* The statement indicates that the second quarter 2009 detections of acetone are not truly representative of groundwater quality at the facility. Acetone was also detected in the field and equipment blanks during second quarter 2010. A copy of the statement from PDC Laboratories along with the field/equipment blank analytical is provided in Appendix D. The detections of acetone at upgradient well G13D are due to laboratory/sampling contamination, therefore no further action is necessary for this parameter.

### **3.3.5 Benzene**

The second quarter 2010 concentrations of benzene exceeded the preceding fourth quarter 2009 concentrations at upgradient wells G09D and G13S and well G51S. The detected concentrations are well below the AGQS/MAPC value (5 ug/L). Additionally, the concentration in G51S (1.1 ug/l) is less than those detected in G09D (1.9 ug/l) and G13S (1.6 ug/l). The concentration detected in downgradient well G51S appears directly related to concentrations detected in upgradient wells G09D and G13S. Since concentrations remain below the AGQS/MAPC value in all three wells, no further action is necessary for this parameter.

### **3.3.6 Chlorobenzene**

The second quarter 2010 concentrations of chlorobenzene exceeded the AGQS value (5 ug/L) at upgradient wells G09D, G13D, and G13S, and the preceding fourth quarter 2009 concentration at well G51S. The concentration characteristics are the same as discussed above for the occurrence of benzene. The concentration in G51S (1.1 ug/l) is less than those detected in G09D (8.8 ug/l) and G13S (5.9 ug/l). The concentration detected in downgradient well G51S appears directly related to concentrations detected in upgradient wells G09D and G13S. Chlorobenzene is an industrial solvent associated with the Acme Solvents facility located directly upgradient of Winnebago Landfill, therefore no further action is necessary for this parameter.

A complete reevaluation of the background groundwater quality for the Northern Unit has been proposed as part of pending applications Log No. 2010-038 (GMZ investigation report) and Log No. 2010-152 (alternate source demonstration). Concentrations of chlorobenzene will be reevaluated at that time and a revised AGQS will likely be proposed to account for the upgradient concentrations of the parameter. Exceedences of chlorobenzene will continue to be reported to the Illinois EPA in accordance with Condition VIII.14 of the permit; however, any



additional assessment (i.e., alternate source demonstrations/assessment monitoring required by Condition VIII.15) will be conducted as part of the background reevaluation.

### **3.3.7 Dissolved Chromium**

Dissolved chromium at upgradient well R22S has exceeded the AGQS value (19 ug/l) since third quarter 2009. Dissolved chromium was recently added to detection monitoring list G1 as a result of the regulatory amendments imposed by Illinois Pollution Control Board Rulemaking Docket No. R2007-008. There have been no other confirmed exceedences at R22S, with the exception of dissolved chloride and phenolics. However, the exceedences of chloride and phenolics at R22S began prior to waste placement in the Southern Unit (first quarter 2002 for Cell 3). This along with the upgradient position of the well, indicates that the elevated chromium concentrations are not related to waste disposal activities but to spatial variability. As discussed in previous applications (including recent Log Nos. 2007-012, 2008-070, and 2010-152), R22S monitors a lithologic setting significantly different from the rest of the Southern Unit wells. Well R22S screens a silty lens within a clay wedge while all other Southern Unit wells screen aerially extensive sand and gravel deposits. To account for the spatial variability at this location, an intrawell AGQS value of 36.28 ug/l is proposed for dissolved chromium at R22S. The statistical method and intrawell calculations are provided in Appendix E and Appendix F, respectively.

### **3.3.8 Cis-1,2-dichloroethene**

The second quarter 2010 concentration of cis-1,2-dichloroethene exceeded the preceding fourth quarter 2009 concentration at well G41S. Cis-1,2-dichloroethene has been detected historically at G41S during the 2000, 2003, 2004, 2008, and 2009 second quarter events. The detected concentrations are well below the AGQS/MAPC value (5 ug/L). Cis-1,2-dichloroethene has also been detected historically (including second quarter 2010) at upgradient well G20D, which is located between Acme Solvents and the landfill. The historical detections at G20D have been addressed as part of pending Application Log No. 2010-152 (alternate source demonstration). Cis-1,2-dichloroethene is a chlorinated solvent; its presence in upgradient groundwater indicates it is attributable to the Acme Solvents facility and not the landfill. The subject parameter was detected in upgradient well G20D at 10 ug/l during the second quarter 2010, as compared to 1.2 ug/l at G41S during the same time period. It is apparent that the source of the constituent is not the landfill facility.

### **3.3.9 Phenolics**

The second quarter 2010 concentration of phenolics (R39S [16 ug/l] and G52S [17 ug/l]) exceeded the previous fourth quarter 2009 concentration at wells R39S and G52S. Concentrations were well below the AGQS/MAPC (100 ug/l) and show no significant increasing or decreasing trends. Phenolics has also been detected historically (including second quarter 2010) at upgradient well G13D. Those detections have been addressed as part of pending Application Log No. 2010-152 (alternate source demonstration). Since phenolics is detected upgradient to the landfill and current concentrations are below the AGQS value, no further action is necessary for this parameter.

### **3.3.10 Sulfate, dissolved**

Dissolved sulfate at upgradient well G13D has consistently exceeded the AGQS value since second quarter 2007. However, as shown by the trend graph in Appendix C, concentrations have shown an overall decreasing trend the last four quarters. Recent concentrations of

dissolved sulfate do not exceed in any other well, with the exception of G13S. Wells G13D and G13S are upgradient wells for both the Northern and Southern Units at Winnebago Landfill. Due to the upgradient location of the wells, G13D and G13S are not expected to be impacted by the facility. Since concentrations are currently decreasing it is proposed to monitor dissolved sulfate at G13D for another four quarters. If concentrations continue to exceed through second quarter 2011, either a revised AGQS value or further assessment will be proposed. Exceedences of dissolved sulfate at G13D will continue to be reported to the Illinois EPA in accordance with Condition VIII.14 of the permit; however, any additional assessment (i.e., alternate source demonstrations/assessment monitoring required by Condition VIII.15) will be conducted as part of the reevaluation.

### **3.3.11 Tetrachloroethene**

The second quarter 2010 concentration of tetrachloroethene exceeded the preceding fourth quarter 2009 concentration at upgradient well G20D. Historically, tetrachloroethene has consistently been detected at G20D during the second quarter annual sampling events from 1999 through 2010. The detected concentrations are well below the AGQS value (26 ug/L). Tetrachloroethene is a chlorinated solvent; its presence in upgradient groundwater indicates it is likely attributable to the Acme Solvents facility and not the landfill. Since concentrations are below the AGQS value, no further action is necessary for this parameter.

## **4. RECOMMENDATIONS AND CONCLUSIONS**

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Based on an evaluation of the historic sampling results, trend analyses, groundwater flow direction, and background information, the confirmed increases are not associated with the landfill but appear to be related to upgradient groundwater quality or temporal/spatial variability. An intrawell value has been proposed (36.28 ug/l) for dissolved chromium at R22S to address the spatial variability of the screened interval. Concentrations of dissolved sulfate at upgradient well G13D will be monitored over the next four quarters (third quarter 2010 through second quarter 2011). If concentrations continue to exceed the AGQS value through second quarter 2011, either a revised AGQS value or further assessment will be proposed. No further action or assessment is required for any of the remaining subject parameters. This alternate source demonstration fulfills the requirements of Condition No. VIII.15 of Permit No. 1991-138-LF Modification No. 42.